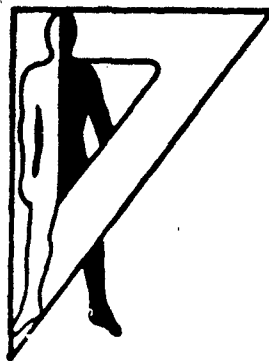


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Technical Memorandum 13-87

PROPOSED MILITARY STANDARD FOR TASK ANALYSIS

Louis B. Myers
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July 1987
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Aberdeen Proving Ground, Maryland

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The text of the standard and the supporting data item descriptions (DIDs) are being published by HEL so that trial implementation may begin in selected procurements prior to completion of the formal DoD-industry coordination. When the standard is officially promulgated in the Acquisition Management Systems and Data Requirements Control List (AMS DL), this interim standard will be canceled.

Users of this interim standard should note that the subject of Task Analysis also appears in three current and frequently used DoD standardization documents: MIL-H-46855, MIL-STD-1379, and MIL-STD-1388. At the time this document is approved, necessary changes will need to be made to all three of those. Users desiring to make trial implementation of this interim standard will need to tailor carefully any applications of the other three standards.

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FOREWORD

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PROPOSED MILITARY STANDARD FOR TASK ANALYSIS

This standard is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Purpose.

This standard establishes and defines the requirements for performing a task inventory and task analysis as part of the development and acquisition of military systems, equipment, and facilities. These requirements include the work to be performed by the contractor in conducting a task inventory and task analysis during all phases of system development and task inventory and task analysis applications. They are the basis for addressing task inventory and task analysis during equipment design, test and evaluation preparation, training requirements preparation, manning and workload assessment, development of training and maintenance manuals, and other documentation and reporting. Finally, this standard describes the task analysis product that the contractor is to submit to the procuring activity.

1.2 Applicability.

This standard applies to all military systems, equipment, and facility acquisition programs, major modification programs, and applicable research and development projects through all phases of the development and acquisition cycle, except as noted (see Section 1.3). This standard is for use by both contractor and Government activities performing a task inventory and task analysis on systems, equipment, and facilities to which this standard applies. This standard is intended for use by the procuring activity and users of the task inventory and task analysis results to define to the contractor the requirements and deliverables.

1.3 Tailoring the Task Inventory and Task Analysis.

The task inventory and task analysis requirements contained herein may not all be applicable to every program or program phase. In accordance with DoD principles, directives, and regulations governing the application and tailoring of specifications and standards to achieve cost-effective

acquisition and life-cycle ownership of defense materiel, the government shall tailor the standard to specific programs and the milestone phase of the program within the overall life cycle. This tailoring shall consist of the selection of task inventory and task analysis requirements by phase of system, equipment, and facility development in order to impose minimum essential needs and so preclude unnecessary and unreasonable program costs. Guidance for the selection of these specific requirements by the procuring activity is contained in Appendix A.

2. REFERENCED DOCUMENTS

—MIL-H-46855 Human Engineering Requirements for Military Systems, Equipment and Facilities

—MIL-HDBK-XXXX Handbook on Task Analysis

See references and bibliography for other guidance materials.

3. DEFINITIONS

3.1 Task Analysis.

The end product of a task analysis is a time-oriented description of personnel-equipment/software interactions brought about by an operator, controller, or maintainer in accomplishing a unit of work with an item of equipment or within a system. It shows the sequential and simultaneous manual and cognitive activities of personnel operating, maintaining, or controlling equipment, rather than a sequential operation of the equipment. It is a part of system engineering analysis where system engineering is required.

3.2 Task Inventory.

A comprehensive listing of all tasks performed by system personnel.

3.3 Task Statement.

A task statement is a description of a task. It is composed of three basic elements, 1) an action verb that states what is to be accomplished in the task, 2) an object that identifies what is to be acted upon in the task, and 3) any qualifying phrases needed to distinguish the task from related or similar activities, limit and define the scope of the task, and clearly communicate the nature of the task. The third element is often added only when needed for clarification.

3.4 Critical Task.

Critical tasks are those involving human performance that, if not accomplished in accordance with system requirements, will most likely have adverse effects on mission effectiveness, cost, system reliability, efficiency, or safety.

3.5 Other Task.

Any task that is not a critical task.

3.6 Man-Man Interface.

The actions, reactions, and interactions (i.e., transactions) among persons as they perform jobs, duties, and tasks to operate and maintain a manned system, including peer/peer and subordinate/supervisor interactions.

3.7 Man-Machine Interface.

The actions, reactions, and interactions between humans and other system components. This also applies to a multistation, multi-person configuration or system.

4. GENERAL REQUIREMENTS

A task inventory and task analysis shall be performed and reported during development and acquisition of military systems, equipment, and facilities to ensure effective man-machine and man-man interface design, to facilitate effective training program development and testing and evaluation, and to provide information for manning and workload studies. These activities shall begin in the early stages of the design phase of system development and be carried throughout system development and acquisition. Report(s) of task inventory and task analysis efforts shall provide to the procuring activity such information as is required by the relevant Data Item Description(s) (see Appendix B).

4.1 Task Inventory.

A task inventory shall be prepared to list all of the tasks that operator, maintainer, and support personnel are to perform with regard to the system hardware, equipment, or facility under development. The task inventory shall include a listing of the tasks required to perform operator, maintainer, and support functions and a description of each task in behavioral terms; the tasks shall be organized or grouped according to logical criteria such as purpose, function, etc. The level of detail in the task inventory (e.g., duty, task, subtask, task element) shall be specified in the required Data Item Description as selected by the procuring activity through use of the tailoring guide in Appendix A.

4.2 Task Analysis.

Tasks judged to be critical according to the criteria in paragraph 3.4 shall be subjected to a task analysis. In addition, other tasks shall be analyzed as specified by the procuring activity. A set of data relevant to each task (critical or other) shall be collected and analyzed. For each critical task the minimum data collected and analyzed should be:

- Equipment acted upon
- Consequence of the action

- Feedback information resulting from the action
- Criterion of task accomplishment
- An estimate of probability of error
- An estimate of the time to successful performance
- A time and error rate associated with each critical task and how it relates to the time and error rate and performance time for the overall system.

Additional task data and analyses to be collected and performed by the contractor shall be specified in the required Data Item Description. These data parameters shall be selected by the procuring activity using the tailoring guide in Appendix A.

4.3 Level of Detail and Accuracy.

The level of detail in the task inventory and task analysis may be dependent upon the phase of system development and the task analysis application. In the early stages of system development, the level of detail may be less than in later stages because of the lack of information. As the system develops and hardware/software specifications become solidified, the level of detail should increase. A greater level of detail normally shall be required as the system develops and matures. When feasible, this lack of detail in the early stages can be offset by an Early Comparability Analysis wherein systems, equipment, or facilities similar to those being developed are examined to determine useful task information. The level of detail shall be reflected in the required Data Item Description and the procuring activity shall specify the level of detail using the tailoring guide in Appendix A. As a system develops, the precision of the task inventory and task analysis will improve and be more reliable. As a system develops, changes are made and aspects of previous task inventories and task analyses become obsolete. Thus, they must be updated periodically to remain current. Currency shall be maintained in the task inventory and task analysis throughout system development and acquisition.

4.4 Continuity.

A task inventory and task analysis shall be updated on a continuing basis throughout system development and acquisition. A task inventory and task analysis shall build on previous task inventories and task analyses, with necessary changes and update. The procuring agency is responsible for maintaining and issuing previously completed task inventories and task analyses for update. Thus, there shall be a continuity across the task inventories and task analyses performed during system development and acquisition.

4.5 Database.

A database of task inventory and task analysis information shall be maintained and updated throughout system development and acquisition. This database activity shall be developed and updated as the contractor produces task inventory output and performs the task analysis. As information from these activities is produced through the iterative process, as stated in 4.4, the database shall be updated in a continuous manner. For large or complex systems the database should be computerized. However, task inventory and task analysis data for simple systems may be adequately represented in printed/graphical form. The task inventory database and task analysis database are the property of the procuring activity.

5. SPECIFIC REQUIREMENTS

5.1 Task Inventory.

A task inventory shall be prepared for the military system, equipment, or facility being acquired. This task inventory shall consist of a list of all tasks that operators, maintainers, or support personnel must perform with regard to the system hardware, equipment, or facility under development. Mission analysis, scenarios/conditions, and functional analysis shall have been completed and documented prior to the task inventory and task analysis effort. The task inventory is then developed by examining each system function allocated to personnel and determining what operator, maintainer, or support personnel tasks are involved in the completion of each system function. The inventory shall be organized in terms of system functions, jobs, duties, etc., as reflected in the task taxonomy given in section 5.1.1 of this standard. The task inventory is composed of task statements, each of which consists of a) an action verb that identifies what is to be accomplished in the task, b) an object that identifies what is to be acted upon in the task, and c) qualifying phrases needed to distinguish the task from related or similar tasks. A task statement should exhibit the properties of clarity, completeness, conciseness, and relevance. Clarity is enhanced when easily understood wording is used, when the task statement is precise enough that it means the same thing to all intended users, and when vague statements of activities, skill, knowledge, or responsibility are avoided. A complete task statement contains sufficient detail to meet the needs of all intended users of such data. Concise task statements are brief, begin with an action verb (the subject "I" or "you" is understood), and employ commonly used and well-understood terminology, abbreviations, and acronyms. Finally, a relevant task statement contains only information germane to describing the task, not the qualifications of the operator, maintainer, or support personnel, necessary tools or job aids, and so forth.

5.1.1 Task Inventory Taxonomy.

The task inventory and subsequent task analysis shall be developed for the operator, maintainer, and support personnel involved with the system hardware, equipment, or facility under development. The level of detail in the task inventory shall be specified by the procuring activity. The required level of detail shall be specified in terms of the following taxonomy:

5.1.1.1 Mission.

What the system is supposed to accomplish, e.g., Combat Reconnaissance.

5.1.1.2 Scenario/Conditions.

Categories of factors for constraints under which the system will be expected to operate and be maintained, e.g., day/night, all-weather, all-terrain operator.

5.1.1.3 Function.

A broad category of activity performed by a system, e.g., Transportation.

5.1.1.4 Job.

The combination of all human performance required for operation and maintenance of one personnel position in a system, e.g., Driver.

5.1.1.5 Duty.

A set of operationally related tasks within a job, e.g., Emergency Repair.

5.1.1.6 Task.

A composite of related activities (perceptions, decisions, and responses) performed for an immediate purpose, e.g., Change a Tire.

5.1.1.7 Subtask.

Activities (perceptions, decisions, and responses) that fulfill a portion of the immediate purpose within a task, e.g., Remove Lug Nuts.

5.1.1.8 Task Element.

The smallest logically and reasonably definable unit of behavior required in completing a task or subtask, e.g., Apply Counterclockwise Torque to Lug Nut With Lug Wrench.

In addition to the task taxonomy given above, a consistent verb taxonomy shall be used in the task statements. All verbs should be unambiguously defined within the taxonomy and used consistently throughout the task inventory. A generally useful and acceptable verb taxonomy is given in MIL-HDBK-XXXX. Some systems, equipment, and facilities will be developed with job categories well-defined from the start of the task analysis activity. In this case, the task inventory shall be organized by jobs, and duties within jobs. New systems, equipment, and

facilities under development may not have identifiable job categories, especially early in system development. In this case, the task analysis activity will be driven by the system functional analysis. As the task inventory and task analysis activity progresses, job positions will be identified by logically related sequences of tasks (duties).

5.2 Task Analysis.

The task analysis process is one by which tasks are described in terms of the perceptual, cognitive, and manual behavior required of an operator, maintainer, or support person, the skills and information required to complete the task, equipment requirements, the task setting, time and accuracy requirements, the probable human errors, consequences of these errors, etc. It is not always necessary or cost-effective to analyze all tasks in the task inventory. However, critical tasks shall always be subjected to a task analysis. Tasks in the task inventory that reflect possible unsafe practices or are subject to promising improvements in operating efficiency shall also be further analyzed, with the approval of the procuring activity. Finally, the procuring activity may require the contractor to analyze other tasks not covered in the above categories, e.g., frequently performed tasks.

5.2.1 Specific Task Analysis Parameters.

The contents of the task analysis shall contain information detailed enough to support whatever human engineering, training, test and evaluation, manning or workload activities are under way at a particular time in system development, as specified by the procuring activity through the Data Item Descriptions. The analysis of a task may include, but is not limited to, the following:

A. Input Parameters

- Information Required
- Information Available
- Initiating Cues
- Data Display Format

B. Central Processing Parameters

- Decision or Evaluation Processes
- Decisions Reached After Evaluation
- Job Knowledge Required
- System Knowledge Required
- Academic Knowledge Required
- Significant Memorization Requirements

C. Response Parameters

- Actions Taken
- Body Movements Required by Action Taken
- Workspace Envelope Required by Actions Taken

Workspace Envelope Available for Actions Taken
Physical Skills Required
Frequency or Interval of Actions
Tolerances of Actions
Tools, Job Aids Used
Support and Test Equipment
Power Requirements
Spares or Parts
Adequacy of Space Support
Controls Used
Control Location
Instrumentation, Displays, Signals Used
Instrumentation, Display, Signal Location

D. Feedback Parameters

Feedback Required
Feedback Available
Cues Indicating Task Completion
Rate of Feedback Update
Format of Feedback

E. Environmental Parameters

Workspace Available
Workspace Envelope Required
Workplace Arrangement
Environment Contamination Level
Climate
Noise
Shock, Vibration, Motion
Lighting
Workspace Accessibility
Workplace Accessibility
Life Support and Protective Gear

F. Safety Parameters

Types and Locations of Safety Hazards
Cause of Safety Hazard
Frequency of Safety Hazard
Consequences of Safety Hazard
Safety Procedures
Recommendation to Eliminate or Minimize Safety Hazard

G. Health Parameters

1. Mechanical Forces

Impulse Noise and Blast Overpressure
Steady State Noise
Ultrasound
Vibration and Motion
Acceleration and Deceleration

Impact, Shock and Recoil
Windblast
Pressure Fluctuations
Weight and Force Loadings

2. Temperature Extremes

Ambient and Radiant Heat
Surface Heat
Flame and Fire
Ambient Cold
Surface Cold

3. Electromagnetic Radiation

Laser Radiation
Microwave and RF Radiation
Ultraviolet Radiation
Intense Visible Light
Ionizing Radiation
Particle Beams
Magnetic Fields

4. Toxic Substances

Fumes, Vapors and Aerosols
Smoke
Liquids
Solids
Dust and Particulates
Chemical Warfare Agents, Biological Warfare Agents, and
Antidotes

5. Psychological Stress

Confined Spaces
Isolation
Sensory and Cognitive Overload
Visual Illusions and Disturbances
Bodily Disorientation (Vestibular and Kinesthetic)
Sustained High-Intensity Operations

6. Other

Caustic Chemicals
Oxygen Deficiencies (Airborne and Terrestrial)
Restricted Nutrition
Restricted Water Availability
Excessive Water, Moisture or Humidity
Human Waste Elimination Constraints
Pests (Insects and Rodents)
Broken Glass, Shrapnel and Missiles
Skin or Eye Contact

**Electric Shock
Bacteria, Viruses and Fungi**

H. Performance Standards and Workload Parameters

Accuracy Requirements
Consequences of Errors
Subjective Assessment by Operator, Maintainer, or Support
Personnel of the Reasons for Their Errors
Description of Each Possible Human-initiated Error(s)
Performance Under Stress
Subjective Assessment of Task Workload
Subjective Assessment of Equipment Design Adequacy for Task
Performance
Subjective Assessment of Sufficiency of Training and
Experience for Task Performance
Physiological Assessment of Workload
Cognitive Workload Assessment
Criteria for Successful Performance
Error Sources
Allocated Elapsed Time or Time Budget
Allocated Man-hours
Predicted Elapsed Time
Predicted Man-hours
Task Schedule or Time Line
Elapsed Time Required to Accomplish the Task

I. Social and Organizational Parameters

Task Interdependence of Crewmembers
Number of Personnel Required to Perform Task
Specialty and Experience Requirements
Division of Labor or Responsibility
Communications Employed

J. Housekeeping Parameters

Task, Subtask, Task Element Title or Statement
Task, Subtask, Task Element Number
Methodology Used to Generate Task Analysis Results
Data Sources Used
Date
Name of Task Analyst
System Mission, Function
Position Title, Duty (of position being analyzed)
Position or Skill Speciality Code (MOS)
Activities Preceding the Task
Concurrent Tasks
Additional Comments
Validation and Quality Control (Especially of Critical Tasks)

K. Other Parameters (not listed above)

5.2.2 Graphical Representation of Task Analysis.

The task analysis shall be represented in narrative form and may be supplemented by graphical format. In graphical form, the task analysis can be represented in a time line chart, operational sequence diagram, flow chart, or other appropriate graphics. Time line charts indicate the interrelationships among tasks as a function of time. Operational sequence diagrams depict the activities of human and machine systems components and the interrelations among these components over time. Flow charts represent the functional dependencies among tasks. The principal advantage of the graphical format is that the sequential and simultaneous relationships among tasks are evident. Each task represented in the graphical format shall be keyed to the narrative format of the task analysis.

5.3 Level of Detail and Precision.

The level of detail and precision used in the task analysis is determined by a) the current phase of system development, and b) the Data Item Description. The analysis may follow the system development cycle in a hierarchical fashion, such that tasks are defined early in system development, then subtasks and task elements thereof are described later in system development. The level of description ultimately used in the task analysis shall be that level sufficient to meet the most detailed requirements specified in the Data Item Description imposed by the procuring activity.

5.4 Continuity.

Task analysis activities shall be carried on to remain current with the design effort during each phase of system development. The application of task analysis is to be considered iterative and evolutionary. In order to facilitate an orderly transition between system development phases, continuity among task analysis efforts must be assured. This continuity shall be assured by 1) moving from the general to the specific as system development permits, 2) maintaining consistent and clearly defined terminology applicable to the system, equipment, or facility, 3) providing sufficient detail, relative to the phase of system development, to meet the most stringent information needs of a particular application, and 4) building upon previous task analysis efforts rather than starting anew each time the system undergoes some modification.

5.5 Database Requirements.

In order to develop a task inventory and task analysis database that is useful for the purposes intended by the procuring activity, a) database inputs shall be traceable, b) the database shall be accessible, c) the database media shall accommodate expansion and updating, and d) the users of the task inventory and task analysis data shall find relevant data and not be confronted with irrelevant data. These attributes are addressed below.

5.5.1 Traceability.

The contractor shall document the task analysis effort to provide accountability from the initial identification of functions, jobs, duties, tasks, subtasks, and task elements pertinent to system or job functions through the task analysis of tasks.

5.5.2 Access.

All data, analyses, flow charts, checklists, notes, and other supporting background documents reflecting task analysis activities shall be maintained by the contractor and made available to the procuring activity upon request. All data created in meeting the requirements of this standard shall be the property of the government.

5.5.3 Database Media.

For large complex systems, task inventory and task analysis data should reside in a computer. Guidance may be obtained from MIL-HOBK-XXXX. However, for relatively simple systems printed forms, supplemented with graphical materials, will suffice.

5.6 Reporting of Task Inventory and Task Analysis.

The content of the task inventory and task analysis reports shall meet the requirements of the required Data Item Description(s).

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APPENDIX A
TAILORING GUIDE FOR MIL-STD-XXXX

TAILORING GUIDE FOR MIL-STD-XXXX

NOTE: THIS APPENDIX PROVIDES GUIDANCE INFORMATION ONLY AND IS IN NO WAY INTENDED TO BE INVOKED AS A CONTRACTUAL DOCUMENT OTHER THAN BY POSSIBLE USE OF TABLE A-1 AS A REFERENCE.

10.0 SCOPE

This appendix provides guidance and criteria for selection by the procuring activity of the specification of the parameters to be included in the task inventory and task analysis by the contractor.

20.0 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on the date of invitation for bids or requests for proposals, form a part of this appendix to the extent specified herein.

SPECIFICATIONS

MIL-H-46855--Human Engineering Requirements For Military Systems, Equipment and Facilities

MIL-HDBK-XXXX--Handbook on Task Analysis

30.0 TAILORING GUIDE

30.1 General. The procuring activity shall first use MIL-H-46855 to determine if a task analysis is to be a required part of the contract. If so, then the procuring activity uses MIL-STD-XXXX to specify what the task inventory and task analysis are to include. The Tailoring Guide provides all interested parties at the procuring activity an opportunity to specify task inventory and task analysis content requirements. Thus, those interested in equipment design, training, test and evaluation, manning or workload will use the Tailoring Guide to specify to the

contractor what the task inventory and task analysis are to include. Table 1 is the Tailoring Guide for use in specifying the task inventory and task analysis parameters. The task analysis parameters are defined in MIL-HDBK-XXXX.

30.2 Description and Use. The Tailoring Guide (Table 1) is a matrix composed of a list of task inventory and task analysis parameters (on the left side), and a set of categories of system development and task analysis applications (across the top). The Guide is used by the procuring activity to check off those parameters the representatives of the procuring activity require the contractor to include in the task inventory and task analysis.

30.2.1 Task Inventory and Task Analysis Parameters. The task inventory and task analysis parameters are identical to those listed and defined in paragraphs 5.1.1 and 5.2.1 of this standard. These parameters are commonly required for task inventories and task analyses by various representatives of procuring activities concerned with equipment design, training, test and evaluation, manning and workload. The list of parameters is comprehensive but not exhaustive and other parameters may be required by the procuring activity. These additional parameters will be specified in the Request for Proposal or the appropriate Data Item Description.

30.2.2 System Development and Task Analysis Applications Categories. The categories listed across the top of the matrix represent phases of system development, and beneath those categories are various application areas of task analyses. The rationale is that a task inventory and task analysis can be required during any or all phases of system development by those concerned with equipment design, training, test and evaluation, manning and workload. Thus, for any phase of system development, procuring activity representatives interested in these applications can specify, for each application, the task inventory and task analysis parameters they want the contractor to provide in response to the required Data Item Description.

30.2.3 Tailoring Guide Use. The Tailoring Guide is used in the following way. Those individuals at the procuring activity check off each parameter that the contractor is to provide in the task inventory and task analysis. The columns used for the checks depend upon the phase of system development and the task analysis application. The phases of system development are noted on the guide, because what is required of the contractor should be somewhat different for each phase. This is because the amount of data and information available for a task inventory and task analysis can be different. For example, in the Conceptual Phase there may not be enough information about the system to be able to determine many of the task inventory and task analysis parameters; whereas in the Development Phase there will probably be enough information to determine all parameters. Thus it is very important that the users of the tailoring guide take into

consideration what data and information will probably exist (including an Early Compatibility Analysis) over the contract duration when selecting the task inventory and task analysis parameters so that the contractor is not given requirements which cannot be met. Since each task analysis application can require different (although overlapping) parameters, each application is given a separate column for selection. Note that in the task inventory, the parameters are in hierarchical order and can only be deleted from the bottom to the top. Once all selections have been made, the procuring activity can list the required parameters in the appropriate Data Item Description(s). Those individuals selected by the procuring activity to select the parameters shall be experts in the activities of human engineering design, test and evaluation, training, manning and workload, and in the use of task analysis results as applied to these activities.

30.3 Contractual Applicability.

30.3.1 Specification Effectivity. The citation of the Tailoring Guide constitutes a required change in application of MIL-STD-XXX.

30.3.2 Further Tailoring. Procuring activities may further tailor the contents of the task inventory and task analysis by including additional parameters in the RFP and contractual package.

30.3.3 Contractor Use. Unless otherwise specified by the procuring activity, contractors shall utilize the completed Tailoring Guide or its results as a baseline in the preparation of RFP responses and task analysis program planning. This does not preclude the contractor from proposing further tailoring.

30.3.4 Evolutionary Development. For evolutionary development of older or existing systems, equipment, software and facilities, the Tailoring Guide will generally apply only to new or revised design and procedure features. Old systems undergoing improvement through evolutionary means will generally not have the Tailoring Guide applied to components retained and unaffected by such evolutionary development techniques. It is important to understand that there may be exceptions to this general rule: therefore, evaluation by the human engineering staff of the procuring activity is considered extremely advisable.

30.3.5 Product Improvement. Recognizing that product improvement actions may occur during more than one acquisition phase and that product improvements can involve conceptual, validation, or full-scale engineering tasks, or a combination of these, the procuring activity should use the tailoring guide to reflect the specific performance objectives of the product improvement program.

30.3.6 Production and Deployment Phase. Design changes affecting human performance during the production and deployment phase,

can, like product improvement actions, involve conceptual, validation, or full-scale engineering tasks, therefore, the procuring activity should use the Tailoring Guide to reflect the specific performance objectives of the design changes.

30.4 Human Engineering Review. Procuring activities are responsible for assuring that the Tailoring Guide as applied to specific contracts has been subjected to human engineering review to insure consistency of the completed guide with human factors requirements, pursuant to the nature of the objectives of the contracts. Specifically, the parameters selected shall be reviewed to assure compliance with human engineering, training, testing and evaluation, manning and workload requirements. Further, there shall be a human engineering review of the tasks selected, from the task inventory, to be subjected to a task analysis to insure necessity and cost-effectiveness.

Table A-1

Tailoring Guide

PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)																		
TASK INVENTORY AND TASK ANALYSIS PARAMETERS	CONCEPTUAL						DEVELOPMENT/VALIDATION						FULL-SCALE DEVELOPMENT					
	DESIGN	TAE	TRAIN	MMN	WELD		DESIGN	TAE	TRAIN	MMN	WELD		DESIGN	TAE	TRAIN	MMN	WELD	TOTAL
<u>Task Inventory</u> 1. Job 2. Duty 3. Task Critical Other 4. Subtask 5. Task element																		
Identification of Critical Tasks																		
<u>Task Analysis</u> A. Input Parameters 1. Information Required 2. Information Available 3. Initiating Cues 4. Data Display Format B. Control Processing Parameters 1. Decision or Evaluation Processes 2. Decisions Reached After Evaluation 3. Job Knowledge Required 4. System Knowledge Required 5. Academic Knowledge Required 6. Significant Memorization Requirements																		

(cont. Inued)

Table A-1 (Continued)

Tailoring Guide

TASK INVENTORY AND TASK ANALYSIS PARAMETERS		PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)									
		CONCEPTUAL					DEVELOPMENT/VALIDATION				
		DESIGN	TAE	TRAIN	WASH	WELD	DESIGN	TAE	TRAIN	WASH	WELD
C. Response Parameters											
1. Actions Taken											
2. Body Movements Required by Action Taken											
3. Workspace Envelope Required by Actions Taken											
4. Workspace Envelope Available for Actions Taken											
5. Physical Skills Required											
6. Frequency/Interval of Actions											
7. Tolerances of Actions											
8. Tools, Job Aids Used											
9. Support and Test Equipment											
10. Power Requirements											
11. Spares or Parts											
12. Adequacy of Space Support											
13. Controls Used											
14. Control Location											
15. Instrumentation/Displays/Signals Used											
16. Instrumentation/Display/Signal Location											
B. Feedback Parameters											
1. Feedback Required											
2. Feedback Available											
3. Cues Indicating Task Completion											
4. Rate of Feedback Update											
5. Format of Feedback											
E. Environmental Parameters											
1. Workspace Available											
2. Workspace Envelope Required											
TOTAL											

Table A-1 (Continued)

Tailoring Guide

PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)																
TASK INVENTORY AND TASK ANALYSIS PARAMETERS	CONCEPTUAL				DEVELOPMENT/VALIDATION				FULL-SCALE DEVELOPMENT							
	DESIGN	YOE	TOTAL	FORM	WELD	DESIGN	YOE	TOTAL	FORM	WELD	DESIGN	YOE	TOTAL	FORM	WELD	TOTAL
2. Workpace Arrangement 4. Environment Contamination Level 5. Climate 6. Noise 7. Shock, Vibration, Motion 8. Lighting 9. Workspace Accessibility 10. Workpace Accessibility 11. Life Support and Protective Gear																
F. Safety Parameters 1. Types and Locations of Safety Hazards 2. Cause of Safety Hazards 3. Frequency of Safety Hazard 4. Consequences of Safety Hazard 5. Safety Procedures 6. Recommendation to Eliminate or Minimize Safety Hazard																
G. Health Parameters 1. Mechanical Forces Impulse Noise and Blast Overpressure Steady State Noise Ultrasound Vibration and Motion Acceleration and Deceleration Impact, Shock and Recoil Windblast Pressure Fluctuations Weight and Force Loadings																

Table A-1 (Continued)

Tailoring Guide

TASK INVENTORY AND TASK ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)																	
	CONCEPTUAL						DEVELOPMENT/VALIDATION						FULL-SCALE DEVELOPMENT					
	DESIGN	TIME	TRAIN	MAN	WELD		DESIGN	TIME	TRAIN	MAN	WELD		DESIGN	TIME	TRAIN	MAN	WELD	TOTAL
2. Temperature Extremes Ambient and Radiant Heat Surface Heat Flame and Fire Ambient Cold Surface Cold																		
3. Electromagnetic Radiation Laser Radiation Microwave and RF Radiation Ultraviolet Radiation Intense Visible Light Ionizing Radiation Particle Beams Magnetic Fields																		
4. Toxic Substances Fumes, Vapors and Aerosols Smoke Liquids Solids Dust and Particulates Chemical Warfare Agents, Biological Warfare Agents, and Antidotes																		
5. Psychological Stress Confined Spaces Isolation Sensory and Cognitive Overload Visual Illusions and Disturbances Bodily Disorientation (Vestibular and Kinesthetic) Sustained High-Intensity Operations																		

Table A-1 (Continued)
Tailoring Guide

PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)																			
TASK INVENTORY AND TASK ANALYSIS PARAMETERS	CONCEPTUAL						DEVELOPMENT/VALIDATION						FULL-SCALE DEVELOPMENT						
	DESIGN	TAE	TRAIN	MAN	WELD		DESIGN	TAE	TRAIN	MAN	WELD		DESIGN	TAE	TRAIN	MAN	WELD	TOTAL	
6. Other Caustic Chemicals Oxygen Deficiencies (Airborne and Terrestrial) Restricted Nutrition Restricted Water Availability Excessive Water, Moisture or Humidity Human Waste Elimination Constraints Pests (Insects and Rodents) Broken Glass, Shrapnel and Missiles Skin or Eye Contact Electric Shock Bacteria, Viruses and Fungi																			
H. Performance Standards and Workload Parameters Accuracy Requirements Consequences of Errors Subjective Assessment by Operator, Maintainer, or Support Personnel of the Reasons for Their Errors Description of Each Possible Human-Initiated Error (s) Performance Under Stress Subjective Assessment of Task Workload																			

Table A-1 (Continued)

Tailoring Guide

TASK INVENTORY AND TASK ANALYSIS PARAMETERS	PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)															
	CONCEPTUAL					DEVELOPMENT/VALIDATION					FULL-SCALE DEVELOPMENT					
	DESIGN	TOE	TRAIN	MANH	WELD	DESIGN	TOE	TRAIN	MANH	WELD	DESIGN	TOE	TRAIN	MANH	WELD	TOTAL
Subjective Assessment of Equipment Design Adequacy for Task Performance Subjective Assessment of Sufficiency of Training and Experience for Task Performance Physiological Assessment of Workload Cognitive Workload Assessment Criteria for Successful Performance Error Sources Allocated Elapsed Time or Time Budget Allocated Man-hours Predicted Elapsed Time Predicted Man-hours Task Schedule or Time Line Elapsed Time Required to Accomplish the Task																
I. Social and Organizational Parameters Task Interdependence of Crewmembers Number of Personnel Required to Perform Task Specialty and Experience Requirements Division of Labor or Responsibility Communications Employed																
J. Housekeeping Parameters Task, Subtask, Task Element Title or Statement Task, Subtask, Task Element Number Methodology Used to Generate Task Analysis Results Data Sources Used																

Table A-1
Tailoring Guide

TASK INVENTORY AND TASK ANALYSIS PARAMETERS		PHASE OF SYSTEM DEVELOPMENT (SYSTEM MATURATION)														
		CONCEPTUAL					DEVELOPMENT/VALIDATION					FULL-SCALE DEVELOPMENT				
		DESIGN	T&E	TRAIN	MAN	WELD	DESIGN	T&E	TRAIN	MAN	WELD	DESIGN	T&E	TRAIN	MAN	WELD
Date																
Name of Task Analyst																
System Mission, Function																
Position Title, Duty (of position being analyzed)																
Position or Skill Specialty Code (NDS)																
Activities Preceding the Task																
Concurrent Tasks																
Additional Comments																
Validation and Quality Control																
(Especially of Critical Tasks)																
K. Other Parameters (not listed above)																
TOTAL																

APPENDIX B
DATA ITEM DESCRIPTIONS

DATA ITEM DESCRIPTION		Form Approved OASD No. 0704-0188 Exp. Date: Jun 30, 1986									
1. TITLE TASK INVENTORY REPORT		2. IDENTIFICATION NUMBER									
3. DESCRIPTION/PURPOSE 3.1 A task inventory is a comprehensive listing of all human tasks associated with a system, equipment, or facility. A task inventory succinctly describes all tasks that might be further analyzed and so drives any subsequent task analysis effort. It also allows for efficient organization of tasks into jobs and duties. (Continued on page 2)											
4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR) ?	6a. DTIC REQUIRED ?	6b. GPOEP REQUIRED ?								
7. APPLICATION/INTERRELATIONSHIP 7.1 This Data Item Description (DID) contains the format and content preparation instructions for the task inventory data generated under the work tasks described in DRAFT MIL-STD-XXXX, Task Analysis Standard. 7.2 This DID is applicable to the acquisition of military systems, equipment, and facilities. (Continued on page 2)											
8. APPROVAL LIMITATION		9a. APPLICABLE FORMS	9b. AISC NUMBER								
10. PREPARATION INSTRUCTIONS 10.1 Source document. The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments and revisions, shall be as reflected in the contract. 10.2 Guidance. The Task Inventory Report (TIR) shall be based on the Task Analysis Standard, DRAFT MIL-STD-XXXX, Methods appropriate to the development of a Task Inventory are described in DRAFT MIL-HDBK-XXXX. 10.3 Content. The Task Inventory Report shall contain the following information items, either numbered or arranged (e.g., by outline or diagram) to show their relationship to each other: <table border="0"> <tr> <td>1. Mission</td> <td>5. Duties</td> </tr> <tr> <td>2. Scenarios/conditions</td> <td>6. Tasks</td> </tr> <tr> <td>3. Requirements</td> <td>7. Subtasks</td> </tr> <tr> <td>4. Jobs</td> <td>8. Task elements</td> </tr> </table> 10.4 Format. The Task Inventory Report shall incorporate both graphic and textual formats. Each of these formats is described below. 10.4.1 A diagram representing the hierarchical relationships among data items shall be prepared. The procuring activity will provide the data for Mission and Scenarios/conditions, and the contractor shall provide all other required data items.				1. Mission	5. Duties	2. Scenarios/conditions	6. Tasks	3. Requirements	7. Subtasks	4. Jobs	8. Task elements
1. Mission	5. Duties										
2. Scenarios/conditions	6. Tasks										
3. Requirements	7. Subtasks										
4. Jobs	8. Task elements										

3. DESCRIPTION/PURPOSE (Cont'd)

This Data Item Description (DID) identifies the Government content and format requirements to prepare a report of task inventory data.

7. APPLICATION/INTERRELATIONSHIP (Cont'd)

7.3 The Task Inventory Report (TIR) will be used as the starting point for the Critical Task Analysis Report (CTAR), DI-H-XXXX, and the Task Analysis Report (TAR), DI-H-XXXX.

7.4 This DID applies to the requirements of DRAFT MIL-STD-XXXX pertaining to the preparation of a task inventory.

10. PREPARATION INSTRUCTIONS (Cont'd)

10.4.2 All tasks, subtasks, and task elements shall be textually represented as task statements. Task statements shall be composed of:

- a. an action verb that states what is to be accomplished in the task,
- b. an object that identifies what is to be acted upon in the task, and
- c. any qualifying phrases needed to distinguish the task from related or similar activities. limit and define the scope of the task, and clearly communicate the nature of the task.

10.4.3 Hierarchically related task inventory data shall be numbered accordingly.

10.5 Traceability. The Task Inventory Report shall include the names of individuals involved in the development and validation of the task inventory.

10.6 Access. In accordance with MIL-H-46855, all data and documentation shall be maintained at the contractor's facilities and made available to the procuring activity for meetings, audits, demonstrations, test and evaluation, and related functions. The completed task inventory database and report become the property of the Government at the end of the task analysis effort.

DATA ITEM DESCRIPTION		Form Approved OMB No. 0704-0188 Exp. Date: Jun 30, 1966	
1. TITLE TASK ANALYSIS REPORT		2. IDENTIFICATION NUMBER	
3. DESCRIPTION/PURPOSE 3.1 The analysis of human task involved in the operation or maintenance of the equipment under development provides one of the bases for making decisions in the areas of human engineering, training, logistics, tests and evaluation, manning, and workload. This Data Item Description (DID) identifies the (Continued on page 2)			
4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR) ?	6a. DTC REQUIRED ?	6b. GDEP REQUIRED ?
7. APPLICATION/INTERRELATIONSHIP 7.1 This Data Item Description (DID) contains the format and content preparation instructions for task analysis data generated under the work tasks described in DRAFT MIL-STD-XXXX, Task Analysis Standard. 7.2 This DID is applicable to the acquisition of military systems, equipment, and facilities. (Continued on page 2)			
8. APPROVAL LIMITATION		9a. APPLICABLE FORMS	9b. AMSC NUMBER
10. PREPARATION INSTRUCTIONS 10.1 <u>Source document.</u> The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments and revisions, shall be as reflected in the contract. 10.2 <u>Guidance.</u> The Task Analysis Report (TAR) shall be based on the Task Analysis Standard, DRAFT MIL-STD-XXXX. Methods appropriate to the development of the Task Analysis Report are described in DRAFT MIL-HDBK-XXXX. 10.3 <u>Content.</u> The Task Analysis Report shall contain the following information items, either numbered or arranged (e.g., by outline or diagram) to show their relationship to each other: A. Input Parameters Information Required Information Available Initiating Cues Data Display Format			

3. DESCRIPTION/PURPOSE (Cont'd)

Government content and format requirements to prepare a report of task analysis data.

7. APPLICATION/INTERRELATIONSHIP (Cont'd)

7.4 This report describes the results of a task analysis performed by the contractor, which provides a database to support efforts in the areas of human engineering, training, logistics, test and evaluation, manning, and workload.

10. PREPARATION INSTRUCTIONS (Cont'd)

B. Central Processing Parameters

Decision or Evaluation Processes
Decisions Reached After Evaluation
Job Knowledge Required
System Knowledge Required
Academic Knowledge Required
Significant Memorization Requirements

C. Response Parameters

Actions Taken
Body Movements Required by Action Taken
Workspace Envelope Required by Actions Taken
Workspace Envelope Available for Actions Taken
Physical Skills Required
Frequency or Interval of Actions
Tolerances of Actions
Tools, Job Aids Used
Support and Test Equipment
Power Requirements
Spares or Parts
Adequacy of Space Support
Controls Used
Control Location
Instrumentation, Displays, Signals Used
Instrumentation, Display, Signal Location

D. Feedback Parameters

Feedback Required
Feedback Available
Cues Indicating Task Completion
Rate of Feedback Update
Format of Feedback

10. PREPARATION INSTRUCTIONS (Cont'd)

E. Environmental Parameters

Workspace Available
Workspace Envelope Required
Workplace Arrangement
Environment Contamination Level
Climate
Noise
Shock, Vibration, Motion
Lighting
Workspace Accessibility
Workplace Accessibility
Life Support and Protective Gear

F. Safety Parameters

Types and Locations of Safety Hazards
Cause of Safety Hazard
Frequency of Safety Hazard
Consequences of Safety Hazard
Safety Procedures
Recommendation to Eliminate or Minimize Safety Hazard

G. Health Parameters

1. Mechanical Forces

Impulse Noise and Blast Overpressure
Steady State Noise
Ultrasound
Vibration and Motion
Acceleration and Deceleration
Impact, Shock and Recoil
Windblast
Pressure Fluctuations
Weight and Force Loadings

2. Temperature Extremes

Ambient and Radiant Heat
Surface Heat
Flame and Fire
Ambient Cold
Surface Cold

3. Electromagnetic Radiation

- Laser Radiation
- Microwave and RF Radiation
- Ultraviolet Radiation
- Intense Visible Light
- Ionizing Radiation
- Particle Beams
- Magnetic Fields

4. Toxic Substances

- Fumes, Vapors and Aerosols
- Smoke
- Liquids
- Solids
- Dust and Particulates
- Chemical Warfare Agents, Biological Warfare Agents, and Antidotes

5. Psychological Stress

- Confined Spaces
- Isolation
- Sensory and Cognitive Overload
- Visual Illusions and Disturbances
- Bodily Disorientation (Vestibular and Kinesthetic)
- Sustained High-Intensity Operations

6. Other

- Caustic Chemicals
- Oxygen Deficiencies (Airborne and Terrestrial)
- Restricted Nutrition
- Restricted Water Availability
- Excessive Water, Moisture or Humidity
- Human Waste Elimination Constraints
- Pests (Insects and Rodents)
- Broken Glass, Shrapnel and Missiles
- Skin or Eye Contact
- Electric Shock
- Bacteria, Viruses and Fungi

H. Performance Standards and Workload Parameters

- Accuracy Requirements
- Consequences of Errors
- Subjective Assessment by Operator, Maintainer, or Support Personnel of the Reasons for Their Errors

10. PREPARATION INSTRUCTIONS (Cont'd)

Description of Each Possible Human-initiated Error (s)
Performance Under Stress
Subjective Assessment of Task Workload
Subjective Assessment of Equipment Design Adequacy for Task Performance
Subjective Assessment of Sufficiency of Training and Experience for Task Performance
Physiological Assessment of Workload
Cognitive Workload Assessment
Criteria for Successful Performance
Error Sources
Allocated Elapsed Time or Time Budget
Allocated Man-hours
Predicted Elapsed Time
Predicted Man-hours
Task Schedule or Time Line
Elapsed Time Required to Accomplish the Task

I. Social and Organizational Parameters

Task Interdependence of Crewmembers
Number of Personnel Required to Perform Task
Specialty and Experience Requirements
Division of Labor or Responsibility
Communications Employed

J. Housekeeping Parameters

Task, Subtask, Task Element Title or Statement
Task, Subtask, Task Element Number
Methodology Used to Generate Task Analysis Results
Data Sources Used
Date
Name of Task Analyst
System Mission, Function
Position Title, Duty (of position being analyzed)
Position or Skill Specialty Code (MOS)
Activities Preceding the Task
Concurrent Tasks
Additional Comments
Validation and Quality Control (Especially of Critical Tasks)

K. Other Parameters (not listed above)

DI-XXXX-XXXX

10.4 Format. The Task Analysis Report shall incorporate graphic formats, textual formats, or both. Each class of format is described below.

10.4.1 Graphic format. Graphics shall be used primarily to pictorially represent the sequential, parallel, or interactive relationships of human task and equipment components.

10.4.2 Textual format. Text shall be used to show a level of detail that cannot be encompassed in the graphics and to describe tasks or task parameters that are not easily represented by graphical means. Narrative formats shall be taken to include lists, outlines, and forms.

10.4.3 Graphic/Textual Format. Task Analysis data that are presented in both graphic and textual formats shall be alphanumerically coded to clearly indicate the redundancy or relationship between graphic and textual formats.

10.5 Traceability. The Task Analysis Report shall include the names of individuals involved in the development and validation of the task analysis data.

10.6 Access. All data and documentation shall be maintained at the contractor's facilities and made available to the procuring activity for meetings, audits, demonstrations, test and evaluation, and related functions. The completed task analysis database and report become the property of the Government at the end of the task analysis effort.